The Mirror

OF

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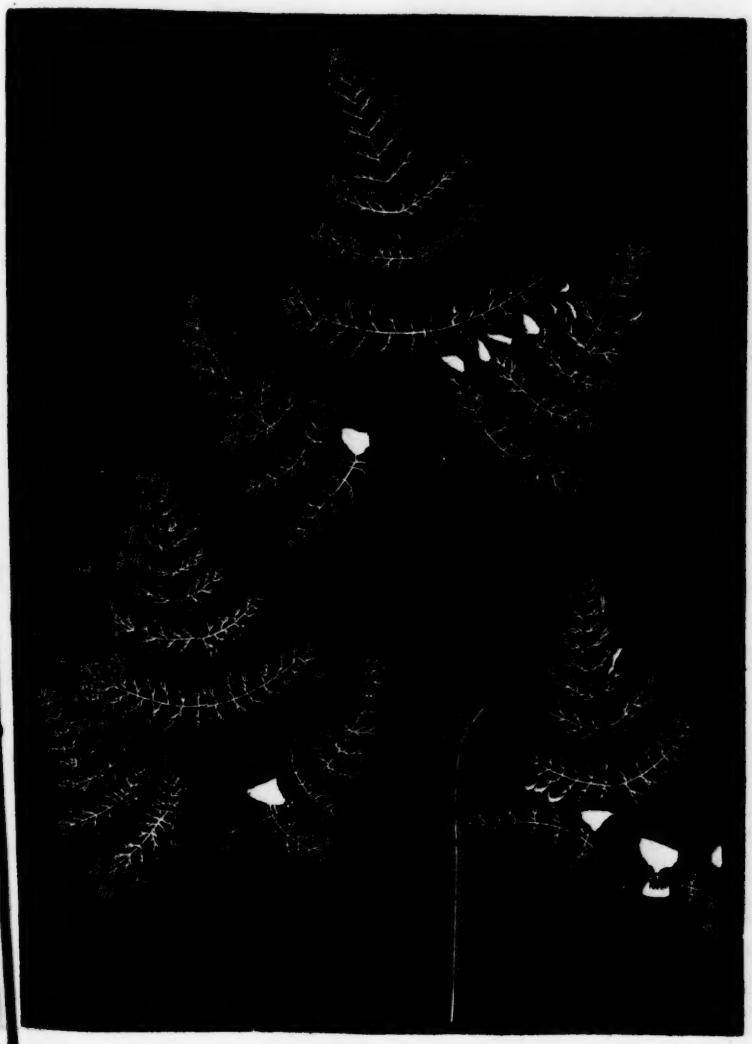


FAC-SIMILE OF A PHOTOGENIC DRAWING.

A TREATISE ON PHOTOGENIC DRAWING.

Our prefixed engraving is a fac-simile of a photogenic drawing, for which we are indebted to the kindness of Dr. Golding Bird, a distinguished botanist, who has published the following very interesting paper on the application of the photogenic art to botanical purposes, in that excellent periodical, the *Magazine of Natural History*.

"The mode of fixing the images of the camera obscura, and copying engravings, by means of the chemical action of light on paper prepared with a solution of chloride of silver, has attracted so much notice, and produced so much popular excitement, that a few observations on this interesting process will not, perhaps, be considered out of place in your Magazine. I venture to occupy your pages with the less reluctance, because I feel that the application of this heliographic or photogenic art will be of immense service to the botanist, by enabling him to procure beautiful outline drawings of many plants, with a degree of accuracy which, otherwise, he could not hope to obtain.

"That light will act on chloride of silver is by no means a novel discovery, and paper prepared with it was long ago used by Ritter and Wollaston, in testing the chemical action of the rays of the solar spectrum; still, in this country it was not, I believe, applied to any purpose likely to be of use to the naturalist and traveller, until brought into notice by the researches of Mr. Talbot. It is not a little amusing to observe how many pretenders to the discovery have started up since the announcement of Mr. Talbot's discovery, and that of M. Daguerre in France. The latter gentleman has, through M. Arago, at a late meeting of the French Institute, announced his mode of preparing a sensitive paper, far exceeding that of Mr. Talbot in delicacy, but otherwise possessing the same property of indicating intensity of light by depth of colour, and consequently differing from that marvellous preparation which he is said to possess, and which represents shadows by depth of colour, precisely as in nature.

"M. Daguerre prepares his heliographic paper by immersing a sheet of thin paper in hydrochloric ether, which has been kept sufficiently long to be acid; the paper is then carefully and completely dried, as this is stated to be essential to its proper preparation. The paper is next dipped into a solution of nitrate of silver, (the degree of concentration of which is not mentioned,) and dried without artificial heat in a room from which every ray of light is carefully excluded. By this process it acquires a very remarkable facility in being blackened on a very slight exposure to light, even when the latter is by no means intense, indeed by the diffused daylight of early evening in the month of February. This prepared paper rapidly loses its extreme sensitiveness to light, and finally becomes not more readily acted upon by the solar beams than paper dipped in nitrate of silver only. M. Daguerre renders his drawings permanent by dipping them in water, so as to dissolve all the undecomposed salt of silver.

"This process is very inconvenient, for many reasons, among which are the difficulty of procuring, as well as the expense of, hydrochloric ether: on this account I prefer Mr. Talbot's process, although it is to be regretted that this gentleman has not stated more explicitly the proportions in which he uses the ingredients employed in the preparation of his sensitive paper. I have performed a set of experiments on this subject, and can recommend the following proportions as the most effective and economical:—200 grains of common salt are to be dissolved in a pint of water, and sheets of thin blue wove post paper saturated with the solution, which, for this purpose, should be poured into a dish, and, the paper being immersed, the application of the solution to every part should be ensured by the use of a sponge. The paper is then to be removed, drained of its superfluous moisture, and nearly dried by pressure between folds of linen or bibulous paper.

"240 grains of fused nitrate of silver are then to be dissolved in 12 fluid ounces of water, and this solution is to be applied by means of a sponge to one side of each sheet of the previously-prepared paper, which side should be marked with a pencil, so that when the paper is fit for use the prepared side may be distinguished. The sheets of paper are then to be hung upon lines in a dark room to dry, and when nearly free from moisture, their *marked* sides are to be once more sponged over with the solution of silver, and finally dried; they are then to be cut into pieces of convenient size, and preserved from light, or even too much exposure to air, by being wrapped up in several folds of brown paper, and kept in a portfolio.

"The proportions above recommended are sufficient for the preparation of a quire of the kind of paper alluded to; if more of the salt of silver were used, the paper would indeed become darker by the action of light, but its expense would be proportionally increased: and when prepared in the manner directed, it assumes, by less than a minute's exposure to the rays of the sun, a rich mulberry brown tint, of sufficient intensity to define an outline very beautifully, which indeed is all that is required.

"To use this paper, the specimen of which a drawing is required, is removed from the herbarium, placed on a piece of the paper, and kept *in situ* by a pane of common glass

pressed by weights: a piece of plate glass, however, is preferable, as it is sufficiently heavy to press the plant close to the paper. The whole is then placed in the sunshine, and in less than a minute all the uncovered parts of the paper will assumd a rich brown tint. The paper should then be removed from the direct influence of the sun, and placed in a book until the drawing be rendered permanent: the specimen, quite uninjured by the process, may then be replaced in the herbarium, and the drawing of another be taken, and so on. So rapidly is this process executed, that twenty-five or thirty drawings may be obtained in an hour, providing we are favoured with a direct sun-beam: if, however, we have only the diffused day-light, five or ten minutes, and sometimes even more, are required to produce a drawing with well-defined outlines.

"If drawings of recent plants be required, specimens of proper size should be cut, and if not too rigid, placed on a piece of the paper, and kept in a proper position by means of a pane of glass, as in the case of dried specimens; but if the plant be rigid, the specimens should be placed for twenty-four hours between folds of blotting-paper, under a heavy weight, before placing them on the sensitive paper.

"Having obtained as many drawings as are required, the next thing is to fix them, so that their otherwise evanescent character may not deprive them of their value. For this purpose place them in a dish, and pour cold water over them; allow them to soak for ten minutes, and then transfer them to, or sponge them over with, a solution, made by dissolving an ounce of common salt in half a pint of water, to which half a fluid ounce of the tincture of the sesqui-chloride of iron has been added. The drawings thus prepared may be dried by pressure between folds of linen, and exposure to the air; and may then be examined without danger. On looking at them every one must be struck with the extreme accuracy with which every scale, nay, every projecting hair, is preserved on the paper; the character and habit of the plant is most beautifully delineated, and if the leaves be not too opake, the venation is most exquisitely represented; (this is particularly the case with the more delicate ferns, as *Polypodium Dryopteris*.) Among those classes of plants which appear to be more fitted than others for representation by this process, may be ranked the ferns, grasses, and umbelliferous plants; the photogenic drawings of the former, are indeed of exquisite beauty.

"The fact of the object being white on a brown ground does not affect the utility of this mode of making botanic drawings; indeed, I almost fancy that their character is better preserved by this contrast of tint, than by a coloured outline on a white ground. Every one will be fully aware of the value of this process to the botanist, in obtaining drawings of rare plants preserved in the herbaria of others, and which he would otherwise have probably no means of obtaining.

"If the drawing of a tree or large shrub be required, a box, blackened inside, having a hole at one end about 1¼ inch in diameter, must be provided; in this hole should be placed a lens of five or six inches focus; if one of longer focus be used, the dispersion of light becomes too great to ensure an accurate representation. When the tree or shrub is well illuminated by the solar beams, the lens should be presented towards it, at a distance varying of course with the height of the object. A piece of card-board should then be placed in the box, a little beyond the true focus of the lens, and the former moved until a well-defined bright image of the tree, &c., is formed on the card, of course in an inverted direction. The box is then to be placed on any convenient support in this position, and a piece of the prepared paper fixed on the card, the lid of the box is then to be closed, and the whole left for half an hour, at the end of which time a beautifully-accurate outline of the object will be found on the paper, which is then to be rendered permanent in the usual manner. It is obvious that this plan is unavailable on a windy day, on account of the branches of the tree, &c. being continually moving, so that it is of far less use to the botanist than the above-described process for obtaining drawings of small specimens.

"Various other applications of this paper will suggest themselves to the minds of naturalists."

[We shall return to this subject in a future number.]

(*For the Mirror*)

'Tis pleasing to the heart to mark when love's first ray
Rich in delight, wakes in the soul, and paints with hope the way;
When the frail vista of our term, with joyous hue appears,
And seems to bear no trace of grief, no likelihood of tears.

Then fancy, too luxuriant, investeth worldly things,
With garbings of happiness—untrue imaginings.
Rears a new state, unknown to care, in purity benign,
Fair as the flower, amidst whose folds envaried beauties shine.

Oh, that such love so found in youth, would e'er preside in age,
Hallow the eve, as well as morn of mankind's pilgrimage;
Love, hope, and innocence, triune, restore the bliss erst given,
And render every joy of life, akin to those of heaven.

R. J. L.

The Naturalist.

DEW.

Aqueous meteors, such as dew, fogs, clouds, &c., are produced from water raised from the earth and sea by evaporation. Dew appears only on calm and serene nights; and more falls during wet, than during dry winds. In cloudy nights, the quantity is small; and the same if they be windy; and if both together, none at all is deposited. Everything that prevents access to the sky, hinders the deposition of dew. If you put a quantity of wool *on* a table, and an equal quantity *under* it, the quantity of dew acquired by the former, will be more than three times that of the latter. More dew falls on grass than on a gravel-walk; and more on the latter than on polished metals. If clouds come over the sky during a night which has been previously clear, the temperature of the grass has been known to rise ten degrees; and proportionably less dew has been deposited. Grass has been known to be at forty degrees, and gravel at fifty-six, at the same time; and therefore more dew was deposited on the first. The amount of dew depends, not only on the temperature of bodies, but also on the quantity of moisture in the earth. Aristotle looked upon dew as a kind of rain, formed in the lower part of the air, from condensed vapour. As it was discovered that more dew was formed on our bodies, than on a naked sword, it was thought to be of electrical origin; but it has been proved that any electrical phenomenon connected with it, is the *effect* and not the *cause* of dew. Sir John Leslie says, that all bodies radiate heat; and that, during the day, more heat is received by the atmosphere from the sun, than is sent away; and therefore the heat rises; while the contrary takes place at night. In this country, dew is said to fall to the depth of five inches, in the course of the year; but in tropical countries much more. Water obtained from condensed dew, is generally very pure; but sometimes it contains impurities; such as common salt, and in some countries even salt-petre. It sometimes contains carbonic acid; and Dr. Duncan, of Edinburgh, gives an account of an acid dew, obtained from a tree in the East Indies.

FOG.

In this country, it is rare to see the atmosphere quite clear. There are generally clouds, which occasionally sink to the earth, and form mists and fogs. These do not consist of solid drops of water; but of vesicles of water containing air. If they were not *hollow* drops, they would be precipitated rapidly, and not remain suspended. Saussure, during his ascent of Mont Blanc, was surprised to observe in a mist large drops,—some of them larger than peas; but on catching them in his hand, he found they were bladders. It is not easy to tell how the vesicles are formed; or why they are sometimes lighter, and at other times heavier than the atmosphere. Their formation seems to be connected with electricity; but how, we know not. They seem to be charged with *similar* electricity,—being either all *positive* or all *negative*; so that they repel each other. Clouds, fogs, or mists, are formed whenever two strata of air, charged with moisture and of different temperature, are mixed. An iceberg moving through warmer air charged with moisture, causes a deposition of it in the form of mist. Some writers mention a *dry* fog, having the same general characters as an *aqueous* one; but not affecting the hygrometer. The sun and moon appear red through it. In the year 1753, when there were such severe eruptions in Iceland, and earthquakes in Calabria, a fog spread over all Europe, the north of Africa, and for three or four hundred miles over the Atlantic. In many parts it deposited sulphureous and carbonaceous matters. It may be considered to have escaped from the earth; where a great quantity exists, daily increasing or decreasing. In some countries, diseases are connected as much with subterranean action, as with atmospheric changes, occasioned by the escape of noxious vapours from the earth.

SLEET.

When the lower stratum of the atmosphere is warmer than the higher, snow, in passing through it, becomes sleet; and this soon cools the air; so that snow falls.

AVALANCHES.

Enormous masses of ice and snow sometimes roll down the sides of mountains. These masses, which are called "avalanches," are of two kinds; one, which is the most frequent, consisting of light snow, and separating from the part of the mountain above the snow-line. The other kind consists of more solid materials, and is derived from the lower edge of the snow-line; where partial thawings and freezings have produced ice. Sixty soldiers were once killed by an avalanche; and so were a hundred men at St. Bernard's. In the year 1624, three hundred men were buried by an avalanche; and many of them killed; and numerous other instances will be found in modern books of travels.

THE RAINBOW.

The Romans looked upon the rainbow as a syphon, by which water was carried up into the clouds. It only appears when a cloud opposite the sun is letting fall rain; and depends on reflection and refraction of

the rays of light, in passing through the drops of water. Captain Parry once observed a rainbow, in which there were five complete arches. If when the sun is in the horizon, the spectator is placed forty-two degrees above it, the rainbow makes a complete circle. In travelling along the side of a hill, in Ireland, I once observed a rainbow, which formed much more than half a circle; —owing to the height at which I was placed, and its position over the valley giving it plenty of room to develop itself. Lunar rainbows are of frequent occurrence; and (as might be expected) are not so brilliant as solar ones. There is a nautical rainbow, which is seen in stormy seas, where the spray is carried up by the wind; and, in falling, gives rise to a rainbow. For the same reason, a rainbow is sometimes seen near cascades; and sometimes when waves beat on a rocky shore. I observed a rainbow in the spray of the Powerscourt waterfall. Sometimes only fragments of rainbows are seen; and these are considered by sailors to be signs of unsettled weather. In the second, or outer bow, the rays are twice refracted in the same drops of rain; and the last refraction inverts the order of the colours. N. R.

THE BEAR AND THE FOX AT BERNE.

(From the French of Dumas.)

The first pear I threw to the bears was swallowed up by one of them without the least opposition; it was not so, however, with the second. The bear was lazily preparing himself to move to the place where had fallen his dessert, when suddenly out pounced some strange animal, whose form I was altogether unable to discern, from the nimbleness and amazing swiftness of its movements; this animal, without the slightest hesitation, seized upon the pear, close to the bear's nose, and ran off with it into a hole of small dimensions in the wall. A few moments after, I saw the pointed, black nose of a fox, protruding from the hole; his eyes were peering with all the vivacity imaginable around, in expectation of some other feast, to be made at the expense of poor Bruin.

This strange scene excited my curiosity, and I felt a desire to repeat the experiment. For this purpose I bought a few cakes—the fox evidently saw my intention, his eyes were stedfastly fixed on me, and he did not remove them as long as I stayed there. Having then made this purchase, I put the cakes in my left hand, and held one in the other, ready to throw when I saw a fit opportunity. The sly fellow seemed to understand me, and shook his head, as if to enable him to watch my movements with fresh vigour; he then licked his lips, and prepared himself for a leap. I meant, however, to put his agility to a severer test than I had at first done. The bear, on his side, saw all my preparations, and evidently looked upon them with a kind of lazy anticipation of success, holding his mouth wide open, and swinging himself to and fro as he sat on his hind quarters. In the mean time the fox, creeping stealthily along, by this time had entirely come forth from his place of refuge; and then it was I saw the reason why I had not in the first instance recognised the animal; the poor fellow had no tail!

I at length threw the cake; the bear followed the course it took with his eyes, let himself fall on his paws, and prepared himself to fetch it; but he had no sooner made one step towards it, than at a single leap, the fox cleared him; and so correct was his aim, that he fell with his nose exactly upon the cake. The cunning animal, on his way to his retreat, then described an arc of considerable extent; but the bear, furious at the loss he had sustained, and the still greater disappointment he had met with, to defeat his antagonist's purpose, put what principles of geometry he was acquainted with in practice, and flew off in a diametrical trim towards the fox; he was, however, a little too late, and his ponderous jaws met each other with a fearful noise as he reached the hole. I then understood how it was that Master Reynard had lost his tail. H. M.

ORIGIN OF THE GRESHAM LECTURES.

(Concluded from page 231.)

In the terms of the foundation of Gresham College, as given in our last paper, a basis seems to have been laid for a metropolitan university. His will, soon after his death, was confirmed by a private act of Parliament; by which the Royal Exchange, subject to the life-estate of his widow, was vested in the City and Mercer's Company for ever, to the good uses and intents of his will: and, on the death of Lady Gresham, in 1596, the City and the Mercer's Company, coming into possession of the estates, proceeded to execute the trusts of the will; for this purpose they appointed committees of persons selected from their respective bodies; and, for the better discharge of their duties, in the appointment of the first lecturers, they wrote to the Universities of Oxford and Cambridge to nominate two persons in every faculty. The following letter was sent by the Mercer's Company to the University of Oxford:—"To the Right Worshipful our very loving friends the Vice Chancellor, the Masters, and Scholars, of the University of Oxford.

"Right Worshipful.—Where by the late death of the Lady Gresham, certain rents

out of the Royal Exchange, and the dwelling-house of Sir Thomas Gresham, within this city, were by his last will committed in trust to the mayor and commonalty of this city, and to the wardens and corporation of the mystery of Mercers, for the maintaining of divers lectures in sundry faculties, to be publicly read within the said house, whereof certain (to wit) of divinity, astronomy, geometry, and music, were by his said will referred to the ordering and disposition of the mayor and commonalty; the other three (to wit) law, physic, and rhetoric, to the bestowing of the said wardens and corporation of the Company of Mercers; with a sufficient stipend of fifty pounds the year, for the maintaining of every one of the said lectures: we have thought good, for the better discharge of so great a trust committed unto us, and for the avoiding of all error which otherwise might happen to be made by us in our said election, to crave the direction of your learned judgments, and heartily to pray you to name unto us two meet persons (being unmarried, as the will requireth) of best ability in every faculty of those three, that are committed unto us, (to wit) law, physic, and rhetoric; being also furnished with good parts for the profession of the said arts in so public a place, whereof, no doubt, is great expectation throughout this whole realm, with what sufficiency and good dexterity the same is performed; whose names we likewise desire may be set down, and sent unto us, under the seal of that University: that being assisted by your grave directions, we may proceed to make election of the fittest persons in every faculty. Wherein as you shall do a very good work, in furthering a matter of so good importance to the church of GOD, and this commonwealth; so you shall bind ourselves in like respect, to do any office that shall lie in us, which may conduce to the public good of that university. And we praying your answer with all convenient speed, we commend you right heartily to the protection of GOD's Holy Spirit. From London, the 24th of January, 1596. Your very assured loving friends, the Master and Wardens of the Mystery of Mercers, in the name of the whole Corporation. BALDWIN DERHAME, WILLIAM QUARLES, BAPTISTE HICKS, Per me HOLLIBAND."

On the receipt of this, and a similar letter from the city, a convocation of the University of Oxford was held, at which a committee, consisting of twenty-one persons, with the Vice Chancellor and Proctors, was appointed to select the candidates. This committee accordingly nominated two persons in every faculty; and their nominations having been confirmed by a subsequent convocation, were communicated to the City and the Mercer's Company, in letters drawn up by the public orator. A similar application being at the same time made to the University of Cambridge; they fearing the new establishment might prejudice the Universities, after consulting with their Chancellor, Lord Burghley, likewise nominated two candidates in every faculty. In the election, the trustees showed equal regard to the recommendation of either University; taking three of the lecturers from Oxford, three from Cambridge, and the other one on the queen's recommendation. The lecturers, thus chosen, were immediately let into possession of Sir Thomas Gresham's mansion, and commenced their readings in the Michaelmas term of 1597, or 1598. At the commencement of these lectures, it appears that the order in which they are at present read, was established by the mutual consent of the lecturers and trustees; being copied from the practice of the Universities, except as to the English readings, these being specially introduced, for the benefit of the citizens not understanding Latin. About the same time, for the more particular direction of the lecturers, certain ordinances, dated January 16, 1597, in the form of an indenture, between the trustees and the lecturers, appear to have been drawn up by the trustees. These ordinances were never executed or adopted by the lecturers. The following is the provision regarding the lecture on Law: The solemn lectures of law, are to be read twice every week in the term time for one whole hour, in the manner following; namely, for three quarters of the hour in the Latin tongue, and for the other quarter, in the English tongue, which shall be a brief collection or recapitulation of that which was read in the Latin of the same lecture. The times appointed for the solemn law lectures, are every Tuesday of the same terms, in the forenoon, between eight and nine, and, in the afternoon of the same days, from two of the clock until three of the clock. Touching the course to be observed by the law reader in these solemn lectures, it is thought meet, in respect of the end of ordaining this lecture, and for the quality of the hearers, who, for the most part, are like to be merchants and other citizens, that the said law lecture be not read after the manner of the universities, but that the reader cull out such titles and heads of law that may best serve to the good liking and capacity of the said auditory, and are more usual in common practice, which may be handled after the order of Wesenbecius, and certain others, by definition, division; causes, material, formal, efficient, final; effects, contraries; and for that this method being first laid out and judiciously handled, will be most perspicuous, and leave nothing that is material in the whole law, concerning that matter obscure and untouched. The heads and titles of such matters, as seem fittest for this place and auditory, in those solemn

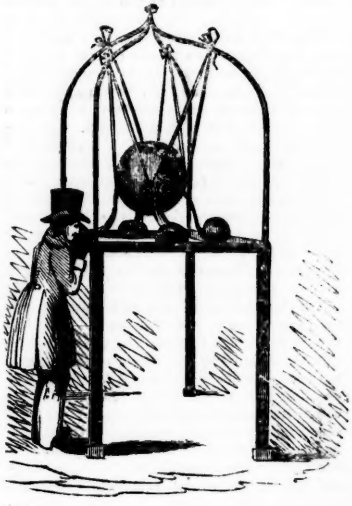
lectures, are these that follow, namely ;— De justitia et jure ; de jurisprudentia ; de jure personarum ; de legibus et consuetudine ; de acquirenda rerum dominio ; de acquirenda, amittenda, recuperanda possessione ; de usurpationibus et usucapionibus ; de servitutibus urbanorum et rusticorum prædiorum ; de usufructu ; de usu et habitatione ; de rei vindicatione, jure sistendi vel arestandi bona vel personas ; de ratihabitione ; de testamentis ; de heredibus sive executoribus ; de legatis ; de fedeicommisso ; de veborum et literarum obligationibus ; de sponsionibus ; de fidejussoribus et mandatoribus ; de solutionibus et liberationibus ; de acceptilationibus ; de donationibus ; de usuris, et eo quod interest, et mora ; de emptione et venditione ; de locatione et conductione : de societate ; de nuptüs et sponsalibus ; de polygamia ; de mandato ; de negotiorum gestorum actione ; de actionibus ex contractu vel delicto ; de ludis illicitis ; de injuriis et famosis libellis ; de dolo malo ; de contractibus innominatis ; de præscriptionibus ; de testibus ; de fide instrumentorum ; de juris et facti ignorantia ; de publicis notariis sive tabellionibus ; de termino moto ; de vi et vi armata ; so mensor falsum modum dixerit ; de operibus publicis ; quod metus causa ; de via publica ; de itinere publico ; de damno infecto, suggrundis, et projectis ; de exercitoria actione vel magistro navis ; de nautis cauponibus, et stabulariis ; de nautis, navibus, et navigatione ; de commerciis et mercatoribus ; de proxene icis ; de nautico fænore ; de monopoliis aliisque conventionibus illicitis ; de jactu et contributione fienda ; de reprisaliis ; de publicanis et vectigalibus ; de nundinis ; de dardanariis et annonæ flagellatoribus ; de bello ; de re et jure militari ; de præda bellica ; de transfugis et emansoribus ; de pænaeorum, qui res vetitas ad hostes deferunt ; de piratis ; de publico commeatu vel salvo conductu ; de captivis et postliminio reversis ; de duello probibito ; de principum confæderationibus, fæderibus, et inducüs ; de lagatis principum ; de legationibus obeundis ; de jure regaliorum ; de nobilitate utraque ; de insignibus et armis ; de regulis juris utriusque. The mansion of Sir Thomas Gresham, where these lectures were first delivered, extended from Bishopsgate Street to Broad Street : it was a spacious and convenient building, with open courts, covered walks, gardens, stables, and other offices. In an essay, by Sir George Buck, it is styled "a little universitie or academiæ epitome ;" and would probably have been chartered, but from a regard to the Universities of Oxford and Cambridge. At the great fire of London, Gresham College having escaped from its devastating effects, became the Chamber, Guildhall, Common-hall, and the Exchange of the remaining city. On which occasion, the lodgings of the Astronomy Lecturer were appropriated to the Lecturers and the Royal Society ; the lodgings of the Divinity Professor were given up to the Lord Mayor ; those of the Law Professor were resigned to the use of the Mercer's Company ; and the other apartments, with the reading-rooms, were appropriated to the City Courts and officers. Small shops were erected in the galleries, the piazza and other parts, and the quadrangle was allotted to the merchants, for an Exchange. W. G. C.

Public Exhibitions.

THE INVISIBLE GIRL

HAVING become an object of great attraction, at the *Adelaide Gallery*, we here give a description of this highly ingenious deception, extracted from that popular and pleasing work, "*Philosophy in Sport, made Science in Earnest.*"

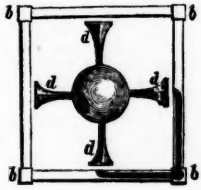
"As sound radiates in all directions, it follows, that, if such radiation be prevented by confining it in tubes, it may be carried to a great distance, with very little diminution of its effect ; and hence the use and application of those trumpets, or tin speaking-pipes, which are commonly used for conveying intelligence from one part of a house to another. The trumpet used by deaf persons acts on the same principle ; but as the voice enters the trumpet at the large, instead of the small end of the instrument, it is not so much confined, nor is the sound so much increased.



The experiment now exhibiting in London, and which was before the public some thirty years ago, under the title of the *Invisible Girl*, and which now, as then, excites general curiosity, depends upon an arrangement of this kind.

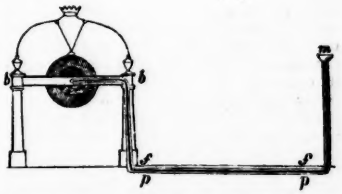
We shall now proceed to describe the visible mechanism, of which the preceding engraving is a true representation.

It consists of a wooden frame, not very unlike a bedstead, having four upright posts, and a cross rail at top and bottom to strengthen them. The frame thus constructed, stands upon a low table, and from the top of each of the four pillars, spring four bent brass wires, which converge at the point *o*. From these wires a hollow copper-ball is suspended by ribands, so as to cut off all possible communication with the frame. The globe is supposed to contain the invisible being, as the voice apparently proceeds from the interior of it; and for this purpose it is equipped with the mouths of four trumpets, placed round it in a horizontal direction, and at right angles to each other, as shown in the annexed section :



in which the globe is represented in the centre, *d d d d* are the trumpets, and *b b b b* the frame surrounding them, at the distance of about half an inch from their mouths. If any person asks a question, by directing the voice into one of the trumpets, an answer is immediately returned from the ball, by some one whose ear is near the mouth of the trumpet, in a voice so distant and feeble, that it appears as if coming from a very diminutive being, and thus heightens the deception. A person may examine, and yet be unable to unravel the mystery.

The mechanism owes its effects to the combined operation of two principals; the concentration and conveyance of sound by means of a speaking pipe, and its reflection from an appropriate surface so as to change its apparent direction, by producing an artificial echo. The pipe is concealed in one of the legs of the frame, and the voice of the person answering (and who is stationed in an adjoining room,) is conveyed to the mouth of the trumpet, and thence reflected to the ear of the observer. The annexed section will render this subject intelligible to the reader.



b b represent two of the legs of the frame, one of which, as well as half the rail, is made into a tube, the end of which opens immediately opposite to the centre of the trumpet. This hole is very small, and is concealed by mouldings; the other end communicates by a tin pipe, *p p*, which passes, in a concealed manner, along the floor of the room, into an adjoining closet, where the confederate is concealed. It is evident, that any sound, directed into the mouth of the trumpet, will be immediately reflected back to the orifice of the tube, and distinctly heard by a person who places his ear to the mouth of the funnel *m*; while the answer returned by him, travelling along the tin-funnel, *p p*, will issue from its concealed orifice, and striking upon the concave surface of the trumpet, be returned to the ear as an echo, and thus appear as if it had proceeded from the interior of the ball.

This deception of the *Invisible Girl* is upon the plan of the old and well-known mechanism of the *speaking-bust*, which consisted of a tube, from the mouth of a bust, leading to a confederate in an adjoining room, and of another tube to the same place, ending in the ear of the figure; by the latter of which, a sound whispered in the ear of the bust was immediately carried to the confederate, who instantly returned an answer by the other tube, ending in the mouth of the figure, which therefore appeared to utter it. The *Invisible Girl* evidently only differs from that contrivance in this single circumstance, that an artificial echo is produced by means of a trumpet, and thus the sound no longer appears to proceed in its original direction."

THE ECCALEOBION.

An exhibition, under the above name, has been opened in Pall Mall, for the purpose of hatching birds, from a wren to an eagle, by means of steam and machinery. The machine wherein the eggs are deposited, is a wooden cabinet, about nine feet long, three feet in breadth, and three feet and a half in height, covered, except the fall-down glazed doors, with cloth; it has eight divisions, capable in the whole of containing upwards of 2,000 eggs, which are merely laid on flannel, and the heat imparted by gas, con-

veyed by pipes placed under the machine, in the course of twenty-one days brings the chick into existence; from this machine they are removed the day after being hatched into a large square glazed case, or box, under which also the gas is conveyed: in a short time they are again removed to a convenient and capacious enclosed place in three divisions, on the floor of the room; the bottom being covered with gravel. Here they have plenty of room for exercise; and here they remain until sold. The room is warmed by gas, kept to an equal degree of temperature.

We saw several of the chicks just emerged from the shell, and beautiful, healthy, and extremely strong they seemed; pecking, almost instantly, the groats strewed for them: in fact, nothing can exceed the liveliness of their appearance: they seem not in the least to feel the want of their natural parent.

On the table, in the centre of the room, are several specimens of the various states of incubation, from the embryo to the perfect formation.

Certainly, it is impossible a more magnificent or astounding exhibition can be offered to the notice of the public: for it fills the mind of the spectator with the most profound awe, wonder, and admiration, of the wisdom and goodness of the Creator. It presents a field of pleasing contemplation: it is a sight of intense interest, that must be witnessed to be duly appreciated; and we are rejoiced to hear that it enjoys the greatest patronage, which it most justly deserves; for it is an exhibition every person ought to witness.

It would be idle to dilate on the various means resorted to, for producing chickens and other birds by artificial means, from the time of the Egyptians to the present day, their modes of proceeding being so well known; but it is necessary to notice, that the first partially-successful effort in England, was that of Mr. Barlow, who, in 1824, had a somewhat similar exhibition to that of the *Eccaleobion*, at the Egyptian Hall, Piccadilly, consisting of a building called an Improved Grapery, heated by steam, sixty feet long, eighteen feet high, and eighteen feet wide: it comprised forty ovens, each containing 1,500 eggs; and he calculated that the building would produce 640,000 chickens annually. We are unable to state the final results of this gentleman's experiments.

In vol. xxxii. of the *Mirror*, pp. 201-2, an account is given of Mr. Warboy's successful experiment of hatching chickens in a tin oven, of his own construction; and we learn by our respected correspondent, Mr. Sculthorpe, that the hen which was reared had been presented to the London Zoological Society, in whose gardens it now remains, in the healthiest state imaginable.

DISCOVERY OF THE TEA PLANT IN BRITISH INDIA.

The project of the cultivation of tea within the vast extent of territory held by Great Britain in India, occurred to the Government at a comparatively early period. In 1793, Lord Macartney despatched some plants from China to Bengal, in various parts of which, his excellency had been informed, were districts adapted for their cultivation. From this period till very lately, when a Committee of tea-culture was instituted, no further steps seem to have been taken. On March 3, 1834, the Committee issued a circular, calling for information on a considerable number of points, the questions being prefaced by a sketch of the information then possessed by the Committee regarding the climate and soil most congenial to the tea-plant, as it exists in China. Yet in the face of the evidence given in the circular, the questions mostly rested on the idea that the plant was a native of hilly countries, in which snow falls during the winter; and in accordance with this idea, the Committee subsequently concluded that the requisite considerations were to be met with on the Himalaya mountains, and that Kimoun appeared to be the most eligible spot. Dr. Falconer was, therefore, requested to report on the localities which appeared to him advantageous for nurseries; and Mr. Gordon, Secretary to the Committee, was despatched to China, to procure seeds and plants for stocking the nurseries. In order to render Mr. Gordon's mission more successful, Dr. Wallich was requested to draw up instructions, both as to choice of stock, and their transmission, as well as that of seeds, to Bengal.

Mr. Gordon succeeded in transmitting a great number of seeds to Calcutta, of which one half germinated. While Mr. Gordon was engaged in China collecting seeds and plants, the discovery of the tea-plant in Upper Assam, and that to a great extent, was brought before the notice of the Committee, who apprised the Government of the fact, in a letter dated December 24, 1834, observing that they were not altogether unprepared for this highly interesting event, they being acquainted with the fact, that, so far back as 1826, Mr. David Scott sent down specimens of the leaves of a shrub which he insisted upon was real tea. Now, although reasons certainly existed why the alleged tea might have proved, as the Committee suggested, nothing but a *Camellia*, yet the very fact of a *Camellia* being reported to exist, should at once have pointed out the immediate necessity of a proper examination of the plant on the spot, because it was known in May 1834, that the plant in question was used by the Singphos as tea, and it is not certain whether some species of *Camellia* do not

produce tea.* Dr. Lindley says, "the tea which is extensively consumed by Europeans is produced by the *Thea*, and different species of *Camellia*."

"The Assam discovery," Dr. Wallich observes, "has placed the labours of the Committee on quite a different footing from that on which they commenced. Who can say what may be the effect of that truly magnificent discovery? The question is now no longer, whether the tea will grow in Hindostan, or whether it produces leaves fit for use (the Assamese and their neighbours, not to mention the Yunamese, consume vast quantities of them), scarcely whether or not the leaf admits of being prepared in the same manner as is done in China for infusion, but simply whether the shrub can be extensively cultivated for commercial purposes, and whether it admits of being introduced into Kumaon, Sirmore, and the like north-west parts of the country."

Mr. Bruce says, that "the tea-plants in Assam have in general been found to grow and to thrive best, near small rivers and pools of water, and in those places where, after heavy falls of rain, large quantities of water have accumulated, and in their struggle to get free have cut out for themselves numerous small channels. Every one of the small islands of the river Kahong is covered with trees of various sizes, and the tea among them; the land being never wholly inundated in the rains, though nearly so. I have never met with the tea-plants growing in the sun, but invariably under shade, in thick woods, or what we call tree-jungle. It struggles for existence amongst so many other trees that it becomes tall and slender, with most of its branches high up. The largest tea-plant I ever met with was 29 cubits high, and four spans round: very few, I should say, attain that size. I have taken great numbers of tea-plants from the jungles, brought them four to eight days' journey to my own house [in Assam] and planted them in my garden, and those that had the most shade, I find, look healthier than those that had none, and they throw out more leaves.† In 1836, the government sent two botanists (Dr. Wallich and Mr. Griffith) and a geologist (Mr. M'Clelland) to examine the Assamese tea-plant. Dr. Wallich, who conducted the deputation, requested me to accompany them, being the only European who had ever visited the tea-tracts, as the different localities are called. One day, after having seen some tea, in company with these gentlemen, and as we were returning, I was informed by some natives, of another patch or tract of tea that had been cut down. We went and examined it, and found the plants just coming up, about six inches high. We were told that the villagers took the tea-plant to be so much jungle, and therefore nearly cut all of it down close to the ground, and set fire to the whole, and then planted paddy or rice on the spot. When we saw the plants, the shoots were coming up from the roots and old stumps, thick and numerous. Some tea-plants I noticed had only been cut a foot, and some two to four feet from the ground; all these threw out numerous shoots and leaves, an inch or two below where they had been cut. I afterwards converted this piece of ground into a tea plantation, on account of Government, and now it is one of the finest I have. Where there was formerly one tea-plant, there are now upwards of a dozen; the new shoots from the old cuttings forming a fine bush, and greatly contrasting with some of the original trees which I have permitted to stand, with slender trunks, and a few branches only at the top. This tract or garden yielded more tea in the season of 1837, than twelve times the space of ground in the jungles would have done. I have found that as the plants that had been cut down grew up again, the leaves acquired a yellowish tinge from their exposure to the sun, and were much thicker than those in the jungles; but this yellow tinge has worn off, and the leaves are now as green as those in the shade. No tea tracts have been discovered north of the Debree river, and they are all on the south side of it. The Muttuck country appears to be one vast tea country; and I feel confident that not one-half of its tea-tracts have been yet discovered." (*To be continued.*)

* The natural group to which the tea-plant belongs comprises but two genera. The first genus consists of only one species, the tea-plant, or *Thea*, itself; and the second genus consists of several species which, according to Dr. Wallich, "have been found wild in Japan, China, Cochin-China, and in Nepaul, and on the mountains bordering on the north-western frontiers of Bengal."

† The latter observation is contrary to the statement of the black-tea makers of China, which will be given hereafter.

New Books.

COINAGE OF IRELAND.

We have to congratulate our readers on the recent publication of an elaborately compiled volume on the Numismatic Antiquities of Ireland, entitled "A View of the Coinage of Ireland, from the Invasion of the Danes to the Reign of George IV.; with copious Tables, Lists, and Descriptions, of Hiberno-Danish and Irish Coins; and an Account of some of the principal Discoveries of Coins in Ireland; illustrated by Engravings of upwards of one hundred and fifty unpublished Coins." The author, Mr. John Lindsay, Barrister at Law, resident at Cork, has, during several years past, devoted his ample means and erudition to the very laudable purpose of collecting every variety that afforded interest in the developing the early monetary history of Ireland; and his success

has been commensurate with his enthusiasm in the cause. Simon's accurate work on the Coins of Ireland, printed in 1749, so far as the sources of information were known to him, is yet a standard of historical inquiry. Snelling's Supplementary Additions, in 1770, advanced new particulars, which emanated from his experience as a coin-dealer, and aided by the rich collections of Benjamin Bartlett and Thomas Hollis. In 1810, Simon and Snelling were both republished, with an additional plate, and descriptions by Mr. George Holmes, of Dublin; and now, notwithstanding the exertions and labours of these men, ardently embued with that love of country which impelled the printing of the volumes under notice, Mr. Lindsay has directed new points of inquiry; has illustrated what was hitherto problematical, by the adducing of new facts, and embattled an array of upwards of one hundred and fifty newly-discovered, and hitherto unknown coins, in illustration of his endeavours to advance the enlargement of the numismatic history of Ireland, already extensively rich, far beyond the ideal conception of the uninterested observer.

The descriptions of the coins, in methodical tables, detail the forms, figures, legends, and weights, respectively of each; and, unsophisticated by conjecture, or falsely-constructed hypothesis, leave the simple fact for the reader to conclude thereon as shall please his humour: and the plates are sufficient, in their manner of execution, as regards the draughtsman, for all the purposes of graphic illustration.

Where all is ample matter of discussion, and every page is fraught with seductive lure for extract, "full to overflowing," of interesting antiquarian research, our prescribed limits inhibit immediate quotation, it is sufficient to strongly commend the "View of the Coinage of Ireland" to the notice of our readers; especially when, not only all the rare coins in Mr. Lindsay's cabinet are described, but also those, pertinent to the subject, in the collections of the Deans of St. Patrick, and Lismore; Sir William Betham; Dr. Smith, of Dublin; Lieut.-Col. Weld Hartstonge; the Rev. J. W. Martin, of Keston, near Bromley, Kent; the Rev. Richard Butler, of Trim; the Rev. T. R. England; the Rev. John A. Malet, of Trinity College, Dublin; the Rev. E. Marks, of Dublin; the Rev. —— Mochler, of Fermoy; J. L. Coxon, Esq., Flesk Priory, Killarney; J. D. Cuff, Esq., of the Bank, London; Redmond Anthony, Esq, of Piltown, county of Waterford, the talented and public-spirited proprietor of a very interesting collection of Irish antiquities; Mr. Crofton Croker, of the Admiralty; Richard Sainthill, Esq., Cork; John Windele, Esq., of Sunday's Well, Cork; Francis Woodley, Esq., Cork; William Leicester, Esq., Cork; Samuel Wright, Esq., Cork; Joseph and John Humfreys, Esqrs.; Abraham Abell, Esq.; Edward Hoare, Esq., of Factory Hill, Cork; and William Cutter, Esq.

As a passing-word of our notice, and expressive of our gratification on the inspection of Mr. Lindsay's highly treasurable volume, we cannot forego observing on the very high esteem which it excites, when the learning and property of the above-mentioned individuals are considered as employed in so honourable a distinction for the furthering the best interests of society, and promoting inquiries into the almost obsolete and forgotten ages of the National History of Ireland.

Manners and Customs.

SUNDAY PLAYS AND GAMES.

THE following document will doubtless be deemed worthy of preservation in the pages of the *Mirror*, as it shows that in the reign of Good Queen Bess, sports on Sundays, a relic of Papal manners in England, was then common, and were tolerated by authority; it further shows the methods adopted by the government for rewarding the deserving claimants on its bounty, by immediately sanctioning a voluntary contribution on the people, who were in no way injured by the transaction, as a many can always assist a few.

"To all Majors, Shereffes, Constables and other Hed Officers, within the Countie of Middlesex.

"After our hartie commendations, whereas we are enformed that one John Seconton Powlter, dwellinge within the parishe of St. Clements Daines, beinge a poore man, havinge foure small children, and fallen into decaye, ys lycensed to have and use some plays and games, at or uppon nyne severall Sondaies, for his better relief, comfort, and sustentacion, within the Countie of Middlesex, to commense and begynne at and from the xxii nd. daie of Maye next comynge, after the date hereof, and not to remayne in one place not above thre seuerall Sondaies: And we consideringe that greate resort of people is lyke to come thereunto, we will and require you, as well for good order, as also for the preservation of the Queen's Majesty's peace, that you take with you foure or fyve of the discrete and substancial men within your office or libertie, where the games shall be put in practice, then and there to forsee and doo your endevour to your best in that behalf durynge the contynuance of the games or plays, which games are hereafter severallie mencyoned, that is to sny, the Shotinge with the Standerd, the Shotynge with the Brode Arrowe, the Shotynge at the twelve skore Prick, the the Shotynge at the Turke, the Leppinge

for Men. the Runninge for Men, the Wrastlinge, the Throwinge of the Sledge, and the Pytchinge of the Barre, with all such other games, as have at anye time heretofore or now be lycensed, used or played.

"Yeoven [Given] the xxvi th. Daie of Aprill [1569] in the eleventh yere of the Quene's Majesty's raigne."

Progress of Science.

BOTANY.

At a meeting of La Societé Royale d'Agriculture de Lyon, M. Vilmorin remarked, that the artichoke was known as an edible plant by the Romans, but forgotten or disdained during the dark ages, till it came into notice again in the 16th century. Almost all the parts of this plant, he says, may be rendered useful. The leaves yield an extract, which will serve as a substitue for quinine. The leaves themselves may be cooked and eaten after the fruit is gathered, or used as fodder, mixed with certain grasses; they may be substituted for hops in making beer; and they contain a great quantity of pot-ash.

M. Seringe argues, from physiological facts, that pruning the mulberry at the same time when the leaves are gathered from it, will produce a handsomer and a longer-lived tree, and a greater return of leaves.

CHEMISTRY.

M. Orfila has discovered a method of detecting the smallest atoms of arsenic, even when administered in solution. For this he used a lamp, the hydrogen gas of which was produced by a piece of zinc steeped in sulphuric acid. The arsenic, however small the quantity, when exposed to the flame of this gas, is carried along by it; and if a cold substance be presented to the end of the narrow tube conveying the flame, the arsenic will be deposited on it like a spot.—*Athenæum.*

Dr. Edward Moore, with the view of submitting Kyanized wood to the action of the *Limnoria*, placed the following pieces of wood on the piles of the Pitch-House Jetty, in Plymouth Dock-yard, at low-water, on January 12, 1838; namely, a piece of American deal, 4 inches by 10½ thick; also a piece of similar dimensions, which had been soaked for two months in a saturated solution of arsenic; and two others which had been prepared with Kyan's solution, by Mr. W. Evans, the Plymouth agent of the patentee. On the 12th of the following August, the pieces having all been under water for seven months, were taken up by some of the dock-yard men. It was found that the protected pieces had all been acted on, though not to quite so great an extent as the plain piece of deal; but the specimens were dotted with *Balani* and *Flustræ*, and all containing *living Limnoriæ*; and it was evident that, though retarded, the destruction of the wood would, in a few months more, have been equally as certain as where none of the above preparations had been employed. Dr. Moore considers it highly improbable that any protection can be afforded in cases of this kind from the employment of soluble substances; for in the instance of the solution of oxide of arsenic, or of the bi-chloride of mercury, (corrosive sublimate,) which Kyan's solution is known to be, it is evident that any additional quantity of fluid coming in contact with it will dilute it, or redissolve any of the salt which might have been deposited in the pores of the wood, by drying; the continual washing of the sea will effectually clear the surface of the wood of any deleterious matter; and although the foremost depredators may perish in making a lodgment in the interior, yet myriads are ready to supply their places, and to maintain the ground already gained, while the continued action of the water will tend to assist them in their efforts: hence he is of opinion that Kyan's solution is not a certain remedy against the destruction of wooden erections in any of the estuaries around our island. The Lords of the Admiralty have ordered the flooring of the south building-slip in this dock-yard to be removed, and replaced with stone. Two arches of the wooden bridge at Teignmouth have fallen down, in consequence of the piers having been destroyed by the *Teredo*; so that we have here found another locality for this animal. —*Magazine of Natural History for April.*

METEOROLOGY.

At the meeting of the Royal Society on the 21st instant, was read an account of the fall of a meteoric stone in Cold Bokkeveld, Cape of Good Hope, in a letter from Mr. T. Maclear. In its descent, which occurred at half-past nine o'clock A. M. October 13, 1838, it appeared like a silvery meteor, traversing the atmosphere for a distance of about sixty miles, and then loudly exploding like a volley of artillery, which was heard over a space of more than seventy miles in diameter—the air meanwhile being calm and sultry. The explosion widely dispersed the stone in fragments—which were at first so soft that they could be cut with a knife, but they subsequently hardened spontaneously. The whole of this meteoric stone, or ærolite, was considered to have been about five cubic feet in bulk. Professor Faraday, who has examined the stone, states, that when dry it possesses a specific gravity of 2.94, and some small evidence of magnetic power irregularly dispersed through it. He found that one hundred parts of the stone yielded the following constituents, namely:—water, 6.5; sulphur, 4.24.; silica

or flint, 28.9; protoxide of iron, 33.22; magnesia, 19.2; alumina, 5.22; lime, 1.64; oxide of nickel, .82; oxide of chromium, .7; cobalt and soda, a trace.

ELECTRICITY.

At the Electrical Society, on the 2nd inst., a paper was read from Mr. M. Roberts, describing an improved Galvanic Battery. The trough is a wooden box, divided into cells by means of circular disks of copper and zinc, in metallic connexion, fitted on a wooden axle, and half immersed in dilute acid. Between the copper and zinc disks, in each cell, a strip of flannel or cloth is extended from one end of the trough to the other, lightly rubbing on the sides of the contiguous disks or plates, which are turned slowly round, by means of a handle attached to the axle. He found the production of gas to be four times as rapid when the disks or plates are turned, than when not, owing to their constant clean surface, and from the increased galvanic energy acquired by the plates being exposed to the air in their revolution, one half of the surface being always so exposed. A battery of this kind is much less expensive than that of Daniell's.

M. Arago has proposed a plan for discharging clouds, in cases of storms, of the electric fluid which they contain, and thus preventing the frequent occurrence of hail-storms, which are generally produced by two currents of clouds, charged with positive and negative electricity, crossing each other. It consists in an improvement upon Franklin's experiment of the kite, with which he obtained an electric spark from a cloud; and afterwards Dr. Romas, of Nerae, and Messrs. Lining and Charles, of the United States, produced electric flashes three and four feet in length. M. Arago recommends that a small balloon, properly secured, armed with metallic points, and communicating with the ground by a rope covered with metallic wire, like a harp-string, should be kept permanently floating in the air, at a considerable height over the spot which it is wished to preserve from the effects of lightning or hail; and he expects that by such an apparatus as this, a cloud might have its electric contents entirely drawn off, without any damage being caused, or that at least the intensity of a hail-storm would be greatly diminished. The experiment is so simple, that it is well deserving of a trial.

IMPORTANT CHEMICAL DISCOVERY.

One of the most valuable improvements in modern times has lately been achieved in the manufacture of soda from common salt, by the use of carbonate of ammonia, instead of the pestiferous method hitherto employed in the production of that alkali. The inhabitants residing in the vicinity of the soda-manufactories at Birmingham, Liverpool, Newcastle, Glasgow, &c., owe the inventors of this invaluable improvement a heavy debt of gratitude, as by this discovery they have put an end to the dreadful nuisance which the public have so long endured. The necessity of decomposing the chloride of sodium by sulphur no longer exists, the newly-discovered process being perfectly free from all noxious vapour. Another important advantage is also secured—namely, that the improved method can with little additional outlay be adapted to the manufactories at present in operation, and the workmen who have hitherto been frequently thrown out of employment and subject to the loss of their wages, in consequence of the numerous indictments that have been laid against their masters for nuisances, will no longer be subjected to this evil. This process, when submitted to an eminent chemical lawyer for his opinion, was pronounced by him to be one of the most brilliant and ingenious discoveries in modern chemistry.—*From a correspondent, in the Morning Chronicle.*

EXPERIMENTAL SUBTERRANEOUS AND SUBAQUEOUS EXPLOSIONS AT CHATHAM BY THE VOLTAIC BATTERY.

For several months past the Royal Engineers, at Chatham, under Colonel Pasley, have been trying continual experiments in firing gunpowder by the voltaic battery, chiefly under water; and after many vicissitudes of partial success and of failure, they have at last succeeded in bringing this process to as much perfection as it seems capable of; that is, to as much certainty as the former methods of firing mines in dry soil. They have repeatedly fixed gunpowder at the distance of 500 feet, with their conducting wires either buried underground or led entirely under water, excepting a few feet connected with the battery, which in their subaqueous explosions was in a boat on the Medway, the powder being lodged at the bottom of that river. In their subterraneous explosion they blew up a field-work; and in one of their subaqueous experiments they blew to pieces a vessel representing a wreck, the fragments of which being of fir timber came up to the surface of the Medway immediately after the column of water thrown up by the explosion. On Saturday April 6th, they applied their voltaic battery to the blasting of rock under water. Two very large and heavy pieces of hard sand-stone were each prepared with a hole three inches in diameter by a borer, after which a charge of three quarters of a pound of powder was put into each, and the upper part of the hole was tamped by pouring in small fragments of broken stone round a cone fixed over each charge, in a new and ingeni-

ous manner, first suggested by Mr. Howe, clerk of works of the Royal Engineer Establishment, more than five years ago, which does not seem inferior in resistance to the common mode of tamping, but is much safer, and far more expeditious. The conducting wires were led from each charge to the battery, which was placed on the gun-wharf, whilst the stones thus prepared and loaded were lowered down from a crane to the bottom of the river opposite, where the water was 14 feet deep at the time. The first stone being of a compact form was blown to pieces, and the rope sling by which it had been lowered, and which had not been removed, was broken. The second stone being of a more irregular shape and much thinner, so that there was not sufficient resistance above and below the charge, was brought up by the crane after the explosion, which had only blown out the solid part of the stone below the bottom of the hole, apparently without injuring any other part of it. Another charge was, therefore, placed in the same hole, which was tamped both above and below in the mode before described, and the stone was then again let down to the bottom of the river; and after firing this second charge, on being hauled up by the crane, it was found to have been broken into three parts, one of which did not reach the surface, whilst the other two being still held together by the slings, after being raised nearly to the level of the wharf, separated from each other and fell to the bottom. One of these charges was contained in a tin cylinder fitted to the size of the hole; the two others in canvass bags of the same form, covered with waterproof composition. These last experiments have proved that the voltaic battery may succeed for blasting rock under water, as well as for blowing wrecks to pieces; and on the former supposition, the holes in the rock would be formed, and the charges placed, by means of the diving-bell.

Nothing can appear easier than to fire gunpowder under water, by the voltaic battery, as exhibited in a lecture-room or scientific institution; but the mode usually adopted on such occasions, of passing the conducting wires into the charge through a cork coated with sealing-wax, and of insulating the remaining length of each wire by inclosing it in small India rubber tubes, would be inadequate and inexpedient for practical purposes in a rapid tideway and in deep water. In Colonel Pasley's experiments at Chatham, corks and sealing-wax were rejected, the former as being too weak, the latter from being liable to crack: and India rubber or caoutchouc was also rejected as being far too expensive—instead of which a composition of pitch softened by bees'-wax or tallow was adopted, the remarkable efficiency of which was proved by keeping one of those experimental charges ten days under water before it was fired, when the powder was still perfectly dry.

The voltaic battery used was of Professor Daniell's improved construction, which, from retaining its energy much longer than any former voltaic battery, he has named the constant voltaic battery, and which Colonel Pasley found to be much superior to the best of the former constructions, at least for the peculiar purpose of firing gunpowder, either under ground or under water.

ESTIMATION OF THE MARINER'S COMPASS IN CHINA.

All the junks which are employed on the ocean carry the mariner's compass, although it does not appear to give the Chinese navigators confidence, as they never, if they can avoid it, steer boldly out to sea, but keep as much as possible within sight of land. The Chinese consider that they were the inventors of this inestimable little instrument, and it cannot be denied that they have had it in use for many centuries. According to Klaproth, the knowledge of this instrument was communicated to the Arabs by the Chinese, and introduced into Europe by the crusades. However much they may fail to rely on its virtues, they appear to be sufficiently aware of its powers. It is considered as a deity, and they treat it as they do the others, with great ceremonial. Pieces of scented ghos-stick are kept constantly burning around it, as in the ghos-houses; while sacrifices of the youngest flesh and the finest fruits are offered to it. Here, ignorance appears to be the parent of superstition; but it is to be hoped that a knowledge of the laws of nature may open their eyes to the wisdom and excellence of the works of the Creator.—*Fan-Qui in China, by C. J. Downing, Esq.*

ON THE PROCESS OF KYANISING SHIP-TIMBER.

It is to be hoped that we shall have no more tampering with dry-rot doctors and their nostrums for the preservation of her Majesty's ships. The steeping of large logs of timber in solutions of any kind *is perfectly useless*: the solution penetrates only skin deep, whereas the real dry rot commences at the centre, where the fibres, being the oldest, first give way, as is the case in standing trees. The only plausible and promising preservative of timber is the gas of the kreosote procured from the distillation of coal or vegetable tar, which, when driven off in the shape of gas, will penetrate every part of the largest logs, and render the wood almost as hard as iron; so hard, indeed, as not easily to be worked. It is understood that, in Belgium,

they are using it as blocks for the railroads.

The worm (*Teredo navalis*), as proved at Sheerness, will not touch it; while pieces of the same wood, *steeped in corrosive sublimate, sulphureous acid, and other active solutions*, were bored through and through. Let our ships be built of good sound English oak, as they formerly were, well seasoned under cover, and left on the stocks as long as they conveniently can be allowed, and we shall hear no more of dry rot, or wet either.—(*Sir John Barrow's Life of Lord Anson*, as quoted in the *Mech. Mag.*, vol. xxx. p. 336.)

The Gatherer.

The splendid present of the Schah of Persia, to her Majesty, consists of between 50 and 60 superb shawls, woven in the looms of Shiraz and Ispahan, exhibiting proofs of skill and taste with which the workmanship of Europe would, perhaps, strive in vain to compete. The borders in some exhibit, in all their details, a triumphal procession; trains of camels and Arab steeds, sumptuously caparisoned; elephants carrying palanquins, musicians gathered in groups, and the countless attendants of many mighty chiefs, being all portrayed with equal fidelity and splendour. These striking and complicated objects are woven in the most exquisite colours, with perfect accuracy of outline, and presenting a combination of forms and hues, unrivalled for their brilliancy and beauty.

Rice paper is made by the Chinese from a plant composed almost wholly of cellular tissue, and is removed from the tree like the unrolling of papyrus.

M. Parrot, who was ordered by the Russian government to explore Armenia and Transcaucasia, asserts that Mount Ararat is of volcanic formation.

A lieutenant on board the *Recherche*, in speaking of the late melancholy Earthquake at Martinique, says, that on the morning of that dreadful visitation (the 11th of January last,) the ship was shaken in every part by a shock that lasted forty minutes, and the masts bent like bamboos. A few seconds after, a species of vapour rose from the shore, escaping through the crevices of the soil, and then the houses of Fort Royal began to fall. Those on the beach formed clouds of dust, and in the midst of the chaos a frightful cry arose from the lips of thousands of unfortunate sufferers. All the crews of the vessels, amounting to 500 men, were ashore in ten minutes afterwards, and at the end of some hours, two hundred persons still living, were disengaged from the ruins, and by the evening, 400 corpses were found.—*Athenæum.*

The number of merchant vessels belonging to Austria at the end of 1838, was 498, with a total of 122,844 tons; the number of steamers was 15, total 5,114 tons. Out of the 498 vessels, 155 were employed in trading to ports in the Adriatic, the Levant, and the Archipelago: 147 in the Black Sea, the Sea of Azof, and the Danube; 167 in the Mediterranean; 12 in the Atlantic; 4 in the Northern Seas and the Baltic, and 13 to America.

The Golden Eagle.—The stamping of this superb coin has commenced at the Mint of Philadelphia: it is 34 years since any of this coin was struck, the coinage ceasing in 1804.

The zoological collection of the Garden of Plants in Paris has just been enriched by the present of an immense tortoise from a gentleman at Havre. It is a native of the island of Ascension, and weighs 500lb. It is five feet in length and three and a half broad. It arrived at the gardens on Friday evening, and on the following day laid four eggs.

Advice.—The wisest men easiest to hear advice, least apt to give it.—*Sir W. Temple.*

Correcting Proofs.—Hazlett, speaking of Burke, says—"I have been assured by a person who had the best means of knowing, that the 'Letter to a Noble Lord' (the most rapid, impetuous, glowing, and sportive of all his works) was printed off, and the proof sent to him, and that it was returned to the printing office with so many alterations and passages interlined, that the compositors refused to correct it as it was, took the whole matter to pieces, and rent the copy." The 'Georgian Era' states, that there is an instance on record, of three volumes of corrections being written to one volume of proofs.

Falsehood.—A liar begins with making falsehood appear like truth, and ends with making truth appear like falsehood.—*Shenstone.*

The Mind and the Imagination.—The mind hath over the body that command which the lord hath over a bondman: but the reason hath over the imagination that command which a magistrate hath over a free citizen, who may also rule in his turn.—*Bacon.*

Titles.—Titles make a greater distinction than is almost tolerable to a British spirit: they almost vary the species; yet, as they are oftentimes conferred, seem not so much the reward as the substitutes of merit.—*Shenstone.*

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